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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,621	10/22/2003	Tadashi Kai	244233US2SRD	4811
22850	7590	02/23/2005	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			HUR, JUNG H	
			ART UNIT	PAPER NUMBER
			2824	

DATE MAILED: 02/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/689,621

Applicant(s)

KAI ET AL.

Examiner

Jung (John) Hur

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/22/03</u> . | 6) <input checked="" type="checkbox"/> Other: <u>search history</u> .                   |

## DETAILED ACTION

### *Information Disclosure Statement*

1. Acknowledgment is made of applicant's Information Disclosure Statement (IDS) Form PTO-1449, filed 22 October 2003. The information disclosed therein was considered.

### *Specification*

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because it uses the phrase "There is provided" which can be implied. It is suggested that said phrase be deleted, and "a magnetoresistance element including" be replaced with --A magnetoresistance element includes--. Correction is required. See MPEP § 608.01(b).

3. Claim 15 is objected to because of the following informalities:

Said claim appears to be same as claim 1. It is suggested that claim 15 be cancelled.

Appropriate correction is required.

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4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishi et al. (JP 2002-280642 A, and its JPO computer translation) in view of Hayashi, Kazuhiko et al. (U.S. Pat. Appl. Pub. No. 2002/0097540).

Regarding claims 1-4, 7-9 and 12-17, Kishi, for example in Figs. 1, 6 and 10, discloses a magnetoresistance element comprising: a free layer (9 in Figs. 1 and 10) comprising a first ferromagnetic layer (3) and a second ferromagnetic layer (7) that face each other and whose magnetization directions are equal to each other (see for example Figs. 6a and 6b) and a nonmagnetic film (5) intervening between the first and second ferromagnetic layers, the free layer being changeable in the magnetization directions on applying a magnetic field (see for example paragraph [0055]); a first pinned layer comprising a third ferromagnetic layer (13) that faces the free layer, the first pinned layer retaining a magnetization direction thereof on applying the magnetic field (see for example paragraph [0043]); and a first nonmagnetic layer (11) intervening between the free layer and the first pinned layer; wherein an average thickness of the nonmagnetic film falls within a range of 0.1 nm to 10 nm (see for example paragraph [0077]); and a second pinned layer comprising a fourth ferromagnetic layer (19 in Fig. 10) that faces the first pinned layer with the free layer interposed therebetween, the second pinned layer retaining a magnetization direction thereof on applying the magnetic field (see for example paragraph

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[0103]); and a second nonmagnetic layer (21) intervening between the free layer and the second pinned layer.

However, Kishi does not disclose that the nonmagnetic film is made of a material selected from the group consisting of titanium, vanadium, zirconium, niobium, molybdenum, technetium, hafnium, tungsten, rhenium, alloys thereof, semiconductors and insulators (instead, Kishi discloses Ru, Au, Ag or Cu for the nonmagnetic film; see for example paragraph [0050]).

Hayashi, for example in Fig. 64 and paragraph [0229], discloses a nonmagnetic film (13, between two magnetic layers 12 and 8b) made of a material selected from the group consisting of titanium (Ti), vanadium (V), zirconium (Zr), niobium (Nb), molybdenum (Mo), technetium (Tc), hafnium (Hf), tungsten (W), rhenium (Re), alloys thereof ("a mixture"), and semiconductors (Si); said group also includes Ru, Au, Ag and Cu, which are disclosed as the nonmagnetic film material in Kishi. Further, Hayashi, for example in Fig. 10 and paragraph [0119], discloses another nonmagnetic material (4, between two magnetic layers, a fixed layer 5 and a free layer 3b) made of a material selected from the group consisting of Ti, V, Zr, Nb, Mo, Tc, Hf, W, Re, semiconductors (Si) and insulators ("oxide" or "nitride"); said group also includes Ru, Au, Ag and Cu, which are disclosed as the nonmagnetic film material in Kishi.

Hayashi shows that titanium, vanadium, zirconium, niobium, molybdenum, technetium, hafnium, tungsten, rhenium, alloys thereof, semiconductors and insulators (recited in the instant claims) and Ru, Au, Ag and Cu (disclosed in Kishi) are equivalent materials known in the art, for their use as a nonmagnetic film material between magnetic layers. Since these materials were art-recognized equivalents at the time the invention was made, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to select any material

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from the group consisting of titanium, vanadium, zirconium, niobium, molybdenum, technetium, hafnium, tungsten, rhenium, alloys thereof, semiconductors and insulators, and substitute it for the nonmagnetic film of Kishi.

Regarding claims 5, 10 and 18, the above Kishi/Hayashi/Kikitsu combination further discloses a magnetic memory (see for example Kishi, Fig. 11) comprising: a word line (for example, 41); a bit line (49) intersecting the word line; and a memory cell (47) positioned in an intersection portion of the word and bit lines (see Fig. 11) and including the magnetoresistance element according to claim 1.

Regarding claims 6, 11 and 19, the above Kishi/Hayashi/Kikitsu combination further discloses a magnetic head (see for example Kishi, paragraphs [0001], [0042] and [0106]) comprising: the magnetoresistance element according to claim 1; and a support member supporting the magnetoresistance element (inherent).

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Whetsone (U.S. Pat. No. 3,880,603) discloses a laminated magnetic material using a refractory metal.

Hayashi (U.S. Pat. No. 5,849,422) discloses various materials for a nonmagnetic film between two magnetic layers.

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Gill (U.S. Pat. No. 5,920,446) discloses laminated free layers.

Kishi et al. (U.S. Pat. No. 6,730,949) discloses a laminated free/storage layer.

Kikitsu, Akira et al. (U.S. Pat. Appl. Pub. No. 2001/0051287) discloses various materials for a nonmagnetic film in a functional layer.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jung (John) Hur whose telephone number is (571) 272-1870. The examiner can normally be reached on M-F 6:30 AM - 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on (571) 272-1869. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jhh



**ANH PHUNG  
PRIMARY EXAMINER**